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Preface

Evolutionary computation (EC) techniques are efficient nature-inspired planning and optimization methods based on the principles of natural evolution and genetics. Due to their efficiency and simple underlying principles, these methods can be used in the context of problem solving, optimization, and machine learning. A large and continuously increasing number of researchers and professionals make use of EC techniques in various application domains. This volume presents a careful selection of relevant EC examples combined with a thorough examination of the techniques used in EC. These papers illustrate the current state of the art in the application of EC and should help and inspire researchers and professionals to develop efficient EC methods for design and problem solving.

All papers in this book were presented during EvoWorkshops 2007, which was a varying collection of workshops on application-oriented aspects of EC. The year 2007 was especially important for EvoWorkshops, which celebrated their tenth edition. In fact, since 1998, EvoWorkshops has provided a unique opportunity for EC researchers to meet and discuss application aspects of EC and it has been an important link between EC research and its application in a variety of domains. During these ten years, new workshops have arisen, some have disappeared, while others have matured to become conferences of their own, such as EuroGP in 2000, EvoCOP in 2004, and EvoBIO in 2007.

Another fundamental novelty in 2007 was the creation of EVO*, Europe's premier co-located events in the field of evolutionary computing, unifying EuroGP, the main European event dedicated to genetic programming, EvoCOP, the main European conference on evolutionary computation in combinatorial optimization, EvoBIO, the first European conference on EC and related techniques in bioinformatics and computational biology, and EvoWorkshops. The proceedings for all of these events, EuroGP 2007, EvoCOP 2007 and EvoBIO 2007, are also available in the LNCS series (number 4445, 4446, and 4447). EVO* was held in Valencia, Spain, during April 11–13, 2007, jointly with the conferences EuroGP 2007, EvoCOP 2007, and EvoBIO 2007.

EvoWorkshops 2007 consisted of the following individual workshops:

- *EvoCOMNET*, the Fourth European Workshop on the Application of Nature-Inspired Techniques to Telecommunication Networks and Other Connected Systems
- *EvoFIN*, the 1st European Workshop on Evolutionary Computation in Finance and Economics
- *EvoIASP*, the Ninth European Workshop on Evolutionary Computation in Image Analysis and Signal Processing
- *EvoInteraction*, the 2nd European Workshop on Interactive Evolution and Humanized Computational Intelligence

- *EvoMUSART*, the Fifth European Workshop on Evolutionary Music and Art
- *EvoSTOC*, the Fourth European Workshop on Evolutionary Algorithms in Stochastic and Dynamic Environments
- *EvoTransLog*, the 1st European Workshop on Evolutionary Computation in Transportation and Logistics

EvoCOMNET addresses the application of EC techniques to problems in communications, networks, and connected systems. New communication technologies, the creation of interconnected communication and information networks such as the Internet, new types of interpersonal and interorganizational communication, and the integration and interconnection of production centers and industries are the driving forces on the road towards a connected, networked society. EC techniques are important tools to be able to face these challenges.

EvoFIN is the first European event specifically dedicated to the applications of EC and related natural computing methodologies, to finance and economics. Financial environments are typically hard, being dynamic, high-dimensional, noisy and co-evolutionary. These environments serve as an interesting test bed for novel evolutionary methodologies. The papers for this year's workshop encompassed several key topics in finance including portfolio optimization, time series forecasting, risk management, failure prediction, agent behavior, and options pricing.

EvoIASP, the longest-running of all EvoWorkshops which reached its ninth edition in 2007, has been the first international event solely dedicated to the applications of EC to image analysis and signal processing in complex domains of high industrial and social relevance.

EvoInteraction deals with various aspects of interactive evolution, and more broadly of computational intelligence in interaction with human intelligence, including methodology, theoretical issues, and new applications. Interaction with humans raises several problems, mainly linked to what has been called the user bottleneck, i.e., human fatigue.

EvoMUSART focuses on the use of EC techniques for the development of creative systems. There is a growing interest in the application of these techniques in fields such as art, music, architecture, and design. The goal of EvoMUSART is to bring together researchers that use EC in this context, providing an opportunity to promote, present, and discuss the latest work in the area, fostering its further developments and collaboration among researchers.

EvoSTOC addresses the application of EC in stochastic environments. This includes optimization problems with changing, noisy, and/or approximated fitness functions and optimization problems that require robust solutions. These topics recently gained increasing attention in the EC community and EvoSTOC was the first workshop that provided a platform to present and discuss the latest research in this field.

EvoTransLog deals with all aspects of the use of evolutionary computation, local search and other nature-inspired optimization and design techniques for the transportation and logistics domain. The impact of transportation and logistics

on the modern economy and society has been growing steadily over the last few decades. Along with the development of more powerful computer systems, design and optimization techniques such as evolutionary computing approaches have been developed allowing one to use computer systems for systematic design, optimization, and improvement of systems in the transportation and logistics domain.

EvoWorkshops 2007 continued the tradition of providing researchers, as well as people from industry, students, and interested newcomers, with an opportunity to present new results, discuss current developments and applications, or simply become acquainted with the world of EC. Moreover, it encourages and reinforces future possible synergies and interactions between members of all scientific communities that may benefit from EC techniques.

This year, the EvoWorkshops had the highest number of submissions ever, cumulating at 160 entries (with respect to 143 in 2005 and 149 in 2006). EvoWorkshops 2007 accepted ten-page full papers and eight-page short papers. Full papers were presented orally over the three conference days, while short papers were presented and discussed during a special poster session. The low acceptance rate of 34.37% for EvoWorkshops 2007, the lowest of all past editions, along with the significant and still-growing number of submissions is an indicator of the high quality of the articles presented at the workshops, showing the liveliness of the scientific movement in the corresponding fields. The following table shows relevant statistics for EvoWorkshops 2006 and EvoWorkshops 2007 (accepted short papers are in brackets):

Year	2007			2006		
	Submissions	Accept	Ratio	Submissions	Accept	Ratio
EvoCOMNET	44	11(7)	25%	16	5	31.2%
EvoFIN	13	6(2)	46.15%	-	-	-
EvoIASP	35	11(10)	31.43%	35	12(7)	34.3%
EvoInteraction	7	4	57.14%	8	6	75%
EvoMUSART	30	10(5)	33.33%	29	10(4)	34.5%
EvoSTOC	11	5	45.45%	12	6(2)	50.0%
EvoTransLog	20	8	40%	-	-	-
Total	160	55(24)	34.37%	149	65(13)	43.6%

We would like to thank the following institutions:

- The Universidad Politécnica de Valencia, for its institutional and financial support and for providing premises and administrative assistance
- The Instituto Tecnológico de Informatica in Valencia, for cooperation and help with local arrangements
- The Spanish Ministerio de Educación y Ciencia, for their financial contribution
- The Centre for Emergent Computing at Napier University in Edinburgh, Scotland, for administrative help and event coordination

Even with an excellent support and location, an event like EVO* would not have been feasible without authors submitting their work, members of the Program Committees dedicating energy in reviewing those papers, and an audience. All these people deserve our gratitude.

Finally, we are grateful to all those involved in the preparation of the event, especially Jennifer Willies for her unaltered dedication to the coordination of the event over the years. Without her support, running such a type of conference with a large number of different organizers and different opinions would be unmanageable. Further thanks to the local organizer Anna I. Esparcia-Alcázar, Ken Sharman, and the Complex Adaptive Systems group of the Instituto Tecnológico de Informàtica for making the organization of such an event possible in a place as unique as Valencia. Last but surely not least, we want to especially acknowledge Leonardo Vanneschi for his hard work as Publicity Chair of the event, and Marc Schoenauer for his continuous help in setting up and maintaining the conference portal.

April 2007

Organization

EvoWorkshops 2007 was part of EVO* 2007, Europe's premier co-located events in the field of evolutionary computing, that also included the conferences EuroGP 2007, EvoCOP 2007, and EvoBIO 2007.

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